Chapter 3
THE PROCESS

With direction from the advisory committees, computer models were developed to evaluate the ability of alternatives (combinations of existing or proposed infrastructure features) to meet the goals and objectives of this plan. The primary analytical tools developed for screening of water management alternatives were three water balance or water budget models for locations within the planning area.

ANALYTICAL TOOLS

- The Southern L-8 Basin Model includes an area of approximately 56 square miles (36,000 acres) and has 13 subbasins. Key surface water features in this model include the southern reach of L-8 Canal (south of the proposed site for the S-316 Water Control Structure) and the M-Canal leading to Grassy Waters Preserve.
- The Water Catchment Area (Grassy Waters Preserve) Model covers an area of approximately 19 square miles (11,000 acres) and includes 2 subbasins. Key surface water features of this model include the M-Canal, Grassy Waters Preserve, and the City of West Palm Beach's water supply lakes
- The Loxahatchee Slough Basin Model covers an area of 117 square miles (75,000 acres) and includes 32 subbasins. Key surface water features are the Loxahatchee Slough, C-18 Canal, C-18 West Canal; and C-14 Canal that connect to the Northwest and Southwest Forks of the Loxahatchee River.

Boundaries of the areas included in each model are shown in **Figure 2**. Hydraulic models were also developed for potential application to analyze conveyance needs for proposed system changes. These models are discussed in detail in the Technical Support Document, Volume II.

MODELING ASSUMPTIONS AND CRITERIA

The Technical Advisory Committee (TAC) approved the modeling assumptions and criteria for success. These assumptions and criteria include reaching technical agreement on, and definition of, specific performance measures for the following issues:

- Loxahatchee Slough - define the volume of water needed to meet hydroperiod restoration targets for the slough, maintain baseflows to the Northwest Fork of the Loxahatchee River, and maintain or improve water supply and flood protection service.

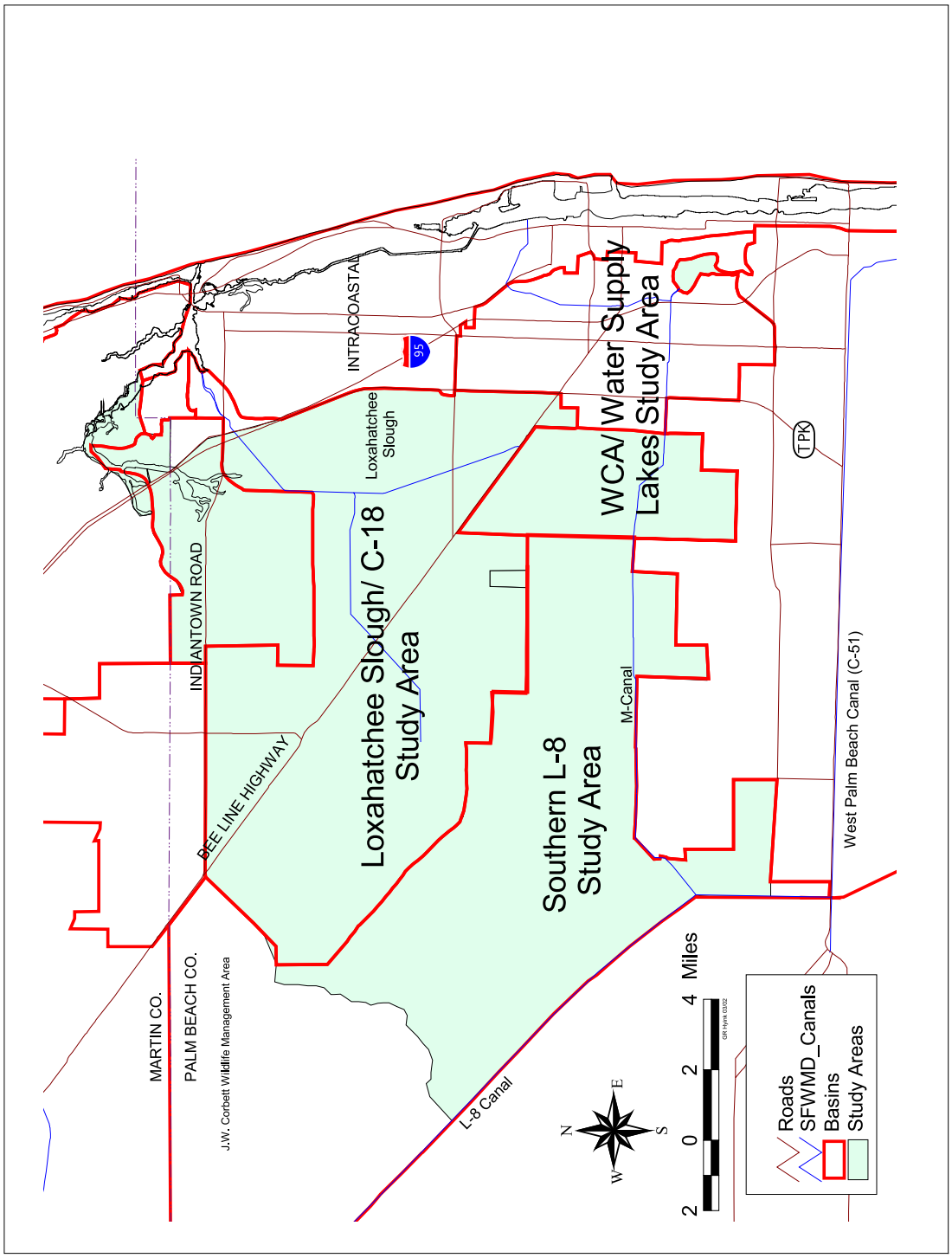

Figure 2. Boundaries of the Northern Palm Beach Subregional Model Study Areas.

- Grassy Waters Preserve - identify the volume of water needed to meet the preserve hydroperiod management targets, and estimated 2020 potable and irrigation water supply demands.
- Southern L-8 Basin - determine the reservoir storage volume required to meet water supply demands in the Grassy Waters Preserve and Loxahatchee Slough basins, or potentially other downstream basins, and confirm that there is sufficient runoff available from the L-8 Basin to fill such a reservoir.

DEVELOPMENT OF ALTERNATIVES

The South Florida Water Management District (SFWMD) and the City of West Palm Beach led the effort to develop a series of water management alternatives for each of the study subareas, with facilitated input from the stakeholder group (Policy Advisory Committee (PAC)), as described in Volume II. The PAC members participated in a series of work group meetings to help identify and screen alternatives for each basin. These workshops were designed to solicit input on candidate alternatives, and help identify criteria that would be used to prioritize alternatives to be evaluated with the modeling tools. Through this participatory process, alternative solutions were developed to achieve the plan objectives.

PERFORMANCE MEASURES

Performance measures were developed as a means to determine how well the goals and objectives of the plan were met during each model simulation. Performance measures were incorporated into each model to assess the benefits of conceptual alternatives and/or compare each modeling simulation. The PAC members suggested adding performance measures to facilitate the comparison of several model simulations at one time. The performance measures added to each of the models incorporated input from the PAC members. Some examples of performance measures are described below.

One of the performance measures for the southern L-8 Basin involved reducing the peak discharges and annual volume discharged to the C-51 Canal and, subsequently, to the Lake Worth Lagoon. This performance measure is presented as a summary table that shows the number of days per year that the discharge to the C-51 is above or below target levels (e.g., see **Table 13** in Volume II, the Technical Support Document).

For the Grassy Waters Preserve model, performance measures were added to track marsh water levels. One format consists of a stage duration curve that shows the percent of time at which a particular stage occurs within the period of record (e.g., **Figure 17**, Volume II). Stages in the Grassy Waters Preserve were also tabulated to determine the number of days they exceeded a selected maximum level or fell below a minimum level (e.g., see **Table 14** in Volume II).

Performance measures were also established for stages in the Loxahatchee Slough (**Figure 27** in Volume II) and for flows discharged to the Northwest and Southwest Forks of the Loxahatchee River (**Tables 16** and **17** and **Figure 36** in Volume II). The stage-versus-time hydrograph for the Loxahatchee Slough was used to compare the target hydroperiod with results of the modeling simulation.

EVALUATION OF ALTERNATIVES

A consensus-based process was used to evaluate each proposed water supply alternative in terms of the ability to meet identified performance measures and the goals and objectives of the Northern Palm Beach County Comprehensive Water Management Plan (NPBCCWMP). The development and use of models were critical to the success of this process, since these tools allowed each proposed alternative to be carefully and consistently tested for performance within agreed-upon parameters. Details of the scenarios evaluated, and the ability to meet performance measures under the various simulations are provided in the Technical Support Document, Volume II.

DEVELOPMENT OF RECOMMENDATIONS

Preliminary model results and recommendations were presented to the PAC at a meeting in January 1998. Based on discussions and questions raised at this meeting, additional modeling was undertaken and presented to the committee in September 2000. Responses to the discussions and issues raised at that final advisory committee meeting are included in **Appendix B** of Volume II. The result of these efforts was the development of a recommended program of structural improvements that would meet the goals and objectives of the plan by increasing the storage and conveyance of surface water within and between the respective basins, as well as through development of alternative water supply sources.